

(amended on January 28, 1999)

## CLAIMS

1. (Amended) A composition comprising

(A) a copolymer which comprises

(1) repeating units which impart water and oil repellency,  
(2) repeating units which impart a solubility in a film-forming auxiliary,  
(3) optional repeating units which lower the glass transition temperature of the copolymer, and

(4) optional repeating units which impart an affinity with a substrate,

10 and

(B) a film-forming auxiliary consisting of an organic solvent which dissolves or swells the copolymer,

wherein said film-forming auxiliary (B) has a solubility parameter (sp) at 25°C in the range between 8 and 11, said film-forming auxiliary (B) is at least one solvent selected

15 from the group consisting of alcohols, glycol ethers, linear or cyclic silicones, esters, diesters, ketones and ethers, and the composition is in the form of an aqueous dispersion of the copolymer dispersed in a medium comprising water in the presence of a nonionic, cationic or anionic emulsifier.

20 1 2. (Amended) A composition comprising

(A) a copolymer which comprises

(I) repeating units which are derived from a monomer having a fluoroalkyl group, a carbon-carbon double bond, and optionally a urethane or urea bond,

(II) optional repeating units which are derived from a monomer having a urethane or urea bond and a carbon-carbon double bond, but no fluorine atom,

25 (III) optional repeating units which are derived from a monomer having a carbon-carbon double bond, the homopolymer of said monomer having a glass transition temperature (Tg) of 50°C or less,

Sub C 2

(IV) optional repeating units which are derived from a monomer having a hydrophilic group and a carbon-carbon double bond, and

(V) optional repeating units which are derived from a monomer having a chlorine atom and a carbon-carbon double bond

5 and

(B) a film-forming auxiliary consisting of an organic solvent which dissolves or swells the copolymer,

wherein at least one of the repeating units (II) and the repeating units (III) is essential, and said film-forming auxiliary (B) has a solubility parameter (sp) at 25°C in the range

10 between 8 and 11, said film-forming auxiliary (B) is at least one solvent selected from the group consisting of alcohols, glycol ethers, linear or cyclic silicones, esters, diesters, ketones and ethers, and the composition is in the form of an aqueous dispersion of the copolymer dispersed in a medium comprising water in the presence of a nonionic, cationic or anionic emulsifier.

15 ~~2~~ 3. A composition according to claim ~~2~~, wherein a monomer having no urethane bond, which constitutes said repeating units (I), is a compound of the formula:



wherein Rf is a linear or branched fluoroalkyl group having 3 to 20 carbon atoms;

R<sup>1</sup> is a linear or branched alkylene group having 1 to 20 carbon atoms, a group of the

20 formula:  $-\text{SO}_2\text{N}(\text{R}^3)\text{R}^4-$  or a group of the formula:  $-\text{CH}_2\text{CH}(\text{OR}^5)\text{CH}_2-$  in which R<sup>3</sup> is an alkyl group having 1 to 10 carbon atoms, R<sup>4</sup> is a linear or branched alkylene group having 1 to 10 carbon atoms, and R<sup>5</sup> is a hydrogen atom or an acyl group having 1 to 10 carbon atoms; and

R<sup>2</sup> is a hydrogen atom or a methyl group.

25 ~~3~~ 4. A composition according to claim ~~2~~, wherein a monomer having a urethane or urea bond and a fluoroalkyl group, which constitutes said repeating units (I), is a monomer obtained by reacting

(I-a) a compound having at least two isocyanate groups,

(I-b) a compound having one carbon-carbon double bond and at least one hydroxyl or amino group, and

(I-c) a compound having a fluoroalkyl group and one hydroxyl or amino group.

5 6. A composition according to claim 2, wherein a monomer which constitutes said repeating units (II) is a monomer obtained by reacting

(II-a) a compound having at least two isocyanate groups, and

(II-b) a compound having one carbon-carbon double bond and at least one hydroxyl or amino group

10 with

(II-c-1) a compound having at least one hydroxyl or amino group, and a polyoxyalkylene chain or a polysiloxane chain,

or

(II-c-2) a compound having at least one hydroxyl or amino group.

15 6. A composition according to claim 2, wherein a monomer which constitutes said repeating units (III) is a monomer having conjugated double bonds or one or two carbon-carbon double bonds, and the homopolymer of which has a glass transition temperature (Tg) of 50°C or less.

6. A composition according to claim 2, wherein said repeating units (III) are derived from a monomer, the homopolymer of which has a glass transition temperature (Tg) of 30°C or less.

20 8. A composition according to claim 2, wherein said repeating units (III) are derived from a monomer, the homopolymer of which has a glass transition temperature (Tg) of 0°C or less.

25 9. (Deleted)

10. (Deleted)

11. (Deleted)

*Su B1*  
12. A composition according to claim 1, wherein said film-forming auxiliary is at least one solvent selected from the group consisting of glycol ethers, esters and diesters.

*SN B2*  
13. (Deleted)

*a a*  
5 14. A composition according to claim 1, which is in the form of an aqueous dispersion of the copolymer dispersed in a medium comprising water in the presence of a cationic emulsifier.

*claim 1*  
15. A water and oil repellent comprising a composition as claimed in ~~any one of~~  
~~claims 1 to 14.~~

*12* 10 16. A method for imparting water and oil repellency to a substrate comprising applying a water and oil repellent as claimed in claim ~~15~~ to the substrate by spraying, coating or dipping.

*13* 17. A water and oil repellent which is in the form of an emulsion comprising a composition as claimed in ~~any one of claims 1 to 14.~~ *claim 1*

*14* 15 18. A water and oil repellent product comprising a water and oil repellent as claimed in claim ~~17~~ and an application apparatus.

*Sub C3* 19. A water and oil repellent product comprising a water and oil repellent as claimed in claim 17 which is charged in a container equipped with a mechanism for spraying a liquid in said container outside.

20 20. A water and oil repellent product comprising a water and oil repellent as claimed in claim 17 which is charged in a container equipped with a mechanism for propelling a liquid in said container outside using a pressure.

*Sub B4 a* 21. A water and oil repellent in the form of foam or mousse comprising a composition as claimed in ~~any one of claims 1 to 14.~~ *claim 1*

*Sub C4*  
22. A water and oil repellent product comprising a water and oil repellent as claimed in claim 21 which is charged in a container equipped with a mechanism for foaming and propelling a liquid in said container outside.

*Sub A 5*  
23. A method for imparting water and oil repellency to a substrate comprising applying a composition as claimed in *claim 1* to *any one of claims 1 to 14* on said substrate by *spraying, coating or dipping using a water and oil repellent product as claimed in any one of claims 18 to 20 and 22.*

*Sub D1*  
24. A method according to claim 23, which further comprises a step of dehydrating said substrate after the treatment by the method as claimed in claim 23.

*Sub A 10*  
25. A water and oil repellent in the form of an aerosol comprising a composition as claimed in *any one of claims 1 to 14.*

26. A water and oil repellent product comprising a water and oil repellent as claimed in claim 25.

*Sub C6 15*  
27. A water and oil repellent product comprising a water and oil repellent as claimed in claim 25 which is charged in a container equipped with a mechanism for spraying a liquid in said container outside.

*Sub A 20*  
28. A method for imparting water and oil repellency to a substrate comprising spraying a composition as claimed in *any one of claims 1 to 14* *on said substrate using water and oil repellent product as claimed in claim 27.*

*Sub A 25*  
29. A water and oil repellent in the state of a solid comprising a composition as claimed in *any one of claims 1 to 14.*

30. A water and oil repellent product comprising a water and oil repellent as claimed in claim 29.

*Sub A 28 25*  
31. A water and oil repellent in the form of a paste comprising a composition as claimed in *any one of claims 1 to 14.*

32. A water and oil repellent product comprising a water and oil repellent as claimed in claim 31.

33. A method for imparting water and oil repellency to a substrate comprising applying a composition as claimed in ~~any one of claims 1 to 14 on said substrate using water~~ claim 1 ~~on said substrate using a~~ <sup>on said substrate using water</sup>,

5 ~~water and oil repellent product as claimed in claim 30 or 32.~~

34. (Amended) A copolymer comprising

(I) repeating units which are derived from a monomer having a fluoroalkyl group, a carbon-carbon double bond, and optionally a urethane or urea bond,

10 (II) repeating units which are derived from a monomer having a urethane or urea bond and a carbon-carbon double bond, but no fluorine atom,

(III) repeating units which are derived from a monomer having a carbon-carbon double bond, the homopolymer of said monomer having a glass transition temperature (Tg) of 50°C or less,

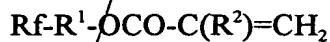
15 (IV) optional repeating units which are derived from a monomer having a hydrophilic group and a carbon-carbon double bond, and

(V) optional repeating units which are derived from a monomer having a chlorine atom and a carbon-carbon double bond,

wherein at least one of the repeating units (IV) and the repeating units (V) is essential.

35. (Amended) A copolymer comprising

20 (I) repeating units which are derived from a monomeric compound of the formula:



wherein Rf is a linear or branched fluoroalkyl group having 3 to 20 carbon atoms;

R<sup>1</sup> is a linear or branched alkylene group having 1 to 20 carbon atoms, a group of the

25 formula:  $-\text{SO}_2\text{N}(\text{R}^3)\text{R}^4-$  or a group of the formula:  $-\text{CH}_2\text{CH}(\text{OR}^5)\text{CH}_2-$  in which R<sup>3</sup> is an

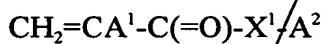
alkyl group having 1 to 10 carbon atoms,  $R^4$  is a linear or branched alkylene group having 1 to 10 carbon atoms, and  $R^5$  is a hydrogen atom or an acyl group having 1 to 10 carbon atoms; and

$R^2$  is a hydrogen atom or a methyl group,

(II) repeating units which are derived from a monomer having a urethane or urea bond and a carbon-carbon double bond, but no fluorine atom,

(III) repeating units which are derived from a monomer having a carbon-carbon double bond, the homopolymer of said monomer having a glass transition temperature (Tg) of 50°C or less,

10 (IV) optional repeating units which are derived from a monomeric compound of the formula:

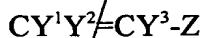


wherein  $A^1$  is a hydrogen atom or a methyl group;

$X^1$  is  $-O-$ ,  $-CH_2-$  or  $-NH-$ ,

15  $A^2$  is a hydrogen atom, a hydrophilic group or a group having a hydrophilic group, and

(V) optional repeating units which are derived from a monomeric compound of the formula:



20 wherein  $Y^1$  and  $Y^2$  are each a hydrogen atom or a fluorine atom;

$Y^3$  is a hydrogen atom, a fluorine atom, a chlorine atom or a methyl group; and

$Z$  is a chlorine atom or a chlorine atom-containing group,

wherein at least one of the repeating units (IV) and the repeating units (V) is essential.

*Added D3*